ANNUAL REPORT 1965

NORTH BAY AREA

water pollution control plant

DIVISION OF PLANT OPERATIONS
Ontario Water Resources Commission

ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Joint Local Advisory Committee
of the North Bay Area Pollution Control Works,
City of North Bay.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the North Bay Area Water Pollution Control Plant, OWRC Project No. 58-S-10.

We appreciate the co-operation you have extended to our Operations staff throughout the year, and trust that continuation of this close association will ensure even greater progress in the sphere of water pollution control.

Yours very truly,

D. S. Caverly,
General Manager.

ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to provide you with the 1965 Annual Report on the operation of the North Bay Water Area Pollution Control Plant, OWRC Project No. 58-S-10.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

CONTENTS

NORTH BAY AREA
water pollution control plant

operated for

THE CITY OF NORTH BAY

and

THE TOWNSHIPS OF WIDDIFIELD AND WEST FERRIS

by the

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN: Dr. James A. Vance

VICE-CHAIRMAN: J. H. H. Root, M.P.P.

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D. A. Moodie
H. E. Brown
L. E. Venchiarutti

GENERAL MANAGER: D. S. Caverly

ASSISTANT GENERAL MANAGERS

L. E. Owers
F. A. Voege
K. H. Sharpe
A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: D. A. McTavish
Operations Engineer: J. N. Dick

801 Bay Street Toronto 5

'65 REVIEW

In 1965 the North Bay Area Water Pollution Control Plant treated a total of 1,380 million gallons of raw sewage or an average daily flow of 3.78 million gallons per day. The average daily flows for 1963, 1964 and 1965 were 3.38, 3.39 and 3.78 mgd respectively.

The plant design flow of 4.0 mgd was exceeded approximately 40 percent of the time.

The strength of the waste in 1965 was 117 ppm BOD and 192 ppm suspended solids. The strength of the waste in 1964 was 157 ppm BOD and 250 ppm suspended solids. The percent reduction of BOD and suspended solids was 90.5 and 94.5 respectively in 1964, and 83.5 and 89.0 respectively in 1965. The decrease in waste concentration and removal was attributed to the increasedflows to the plant.

The cost of operating the North Bay Area Water Pollution Control Plant in 1965 was $79,171.60. The cost of treating one million gallons of waste in 1965 was $57.37.

The operating costs increased in 1965 by approximately $6200 from the 1964 operating cost of $72,953.91. This was mainly caused by an increase of $4000 for salaries, $2000 for power and $1000 for repairs and maintenance.

There was no change in staff in 1965.

Major repair costs in 1965 were the rebuilding of the triplex sludge pump and the Climax engines. Difficulty was experienced with the Climax engines on two occasions: (1) water leaked through the water jacket into the oil pan; (2) the engine was reconditioned. The crankshaft was refinished, the camshaft was refinished, bearings replaced, valves ground, and some exhaust valves replaced. Three sets of gaskets were used on the Climax engines at approximately $150.00 for each set.

The plant was inspected by head office engineers and technicians in 1965 and was found to be in satisfactory condition.

The plant staff carried out their duties in a commendable manner.

GLOSSARY

BOD	biochemical oxygen demand (a measure of organic content)
cfm	cubic feet per minute
comminution	shredding of solids into small fragments
DWF	dry weather flow
effluent	outflow
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpcd	gallons per capita per day
gpm	gallons per minute
grit	sand, dust, stones, cinders and other heavy inorganic material
influent	inflow
lin. ft.	lineal feet
mgd	million gallons per day
mlss	mixed liquor suspended solids
ppm	parts per million
ss	suspended solids
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)

HISTORY
1956 - 1965

INCEPTION

In 1956, the City of North Bay approached the Ontario Water Resources Commission to finance, construct and operate sewage treatment facilities in the municipality. After preliminary discussions were held, it was decided that a joint scheme, including the Townships of West Ferris and Widdifield would most adequately serve the needs of the area. The consulting engineering firm of Graham Reid and Associates Limited was engaged to prepare plans and specifications.

APPROVAL

At a public hearing on September 26th, 1958, the Ontario Municipal Board approved the integrated sewage works scheme.

CONSTRUCTION

The project, consisting of trunk sewers, manholes, appurtenances and an activated sludge sewage treatment plant, was divided into four contracts.

Stirling Construction was awarded the contract for the treatment plant. Beaver Construction and Midwestern Construction shared in the rest of the project.

Construction was substantially completed in the fall of 1960 and the sewage treatment plant was put into operation at that time.

Since the original project 58-S-10 was completed, an additional trunk sewer and metering pit was constructed for the Township of Widdifield as project No. 62-S-103. This feeds into the North Bay treatment plant.

TOTAL COST

The tentative total cost of the combined project was $2,314,543.73.

STAN HEALEY
SUPERINTENDENT

Project Staff

Mechanic Operator

R. Lepage

Electrician Operator

A. Gauthier

Operators

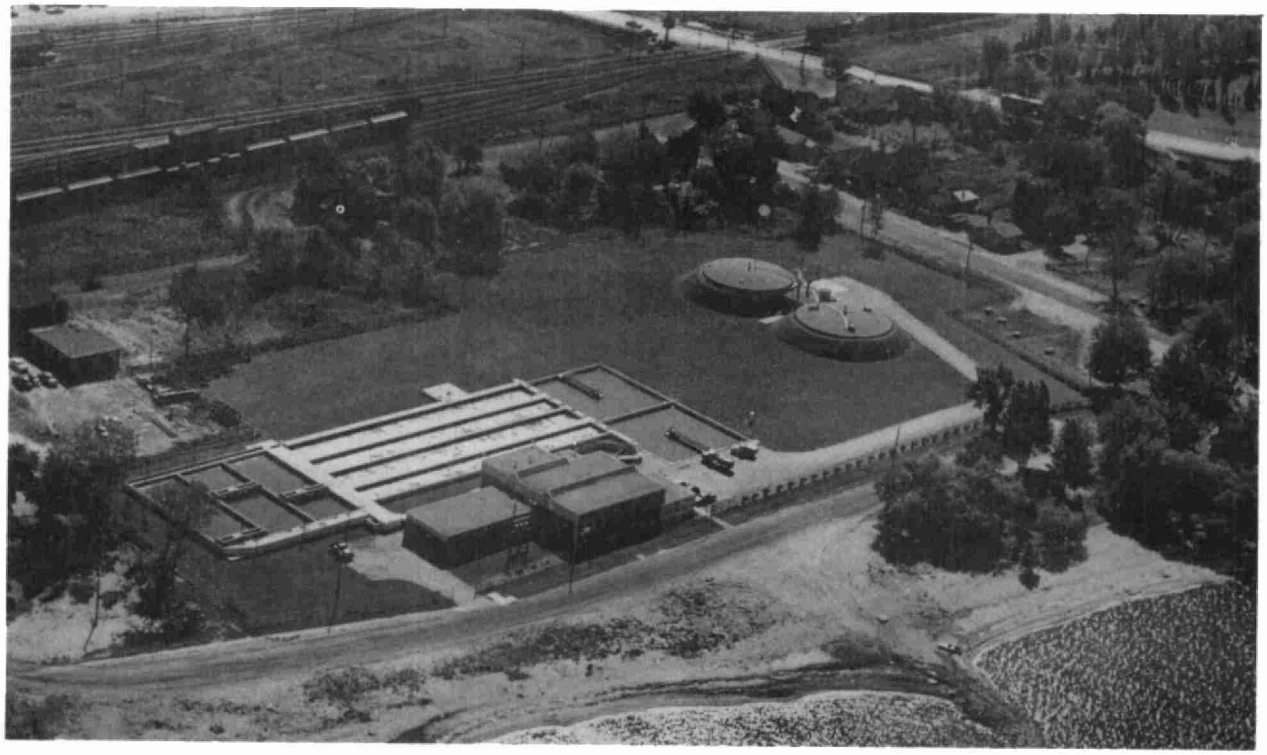
G. Gerbasi
G. Sevigny
J. Sutherland
A. Garrett

COMMENTS

The plant was staffed by a Superintendent, two maintenance men, and four operators. Most of the mechanical and electrical problems were corrected by plant personnel. Equipment which required specialized tools for repair was taken to local machine shops for repair.

Casual staff was employed during the summer months to help in the ground and building maintenance.

The plant was staffed 16 hours a day, 365 days of the year. Inspections made during 1965 by head office engineers and technicians proved the staff performed its duties in a satisfactory manner.



Description of Project

INFLUENT WORKS

From the influent manhole, the sewage flows into the influent works where the first degree of treatment is given. Grit is removed in two square parallel chambers where the velocity of the sewage is reduced to a point whereby grit and sand will settle out but most organic solids will not. The chambers are equipped with mechanical scrapers which gather the grit into the collector channels located beside the grit chambers. The collector channels are equipped with inclined rectangular dragout conveyors which discharge the grit into 45 gallon drums for removal.

Prior to entering the main plant wet well the sewage passes through two parallel Griductors which screen and cut organic solids and rags. In the event that the Griductors must be taken out of service, the plant is equipped with a bypass channel and coarse bar screen.

PRIMARY TREATMENT

From the wet well, the raw sewage is pumped into three primary sedimentation tanks where the sewage is held long enough to allow organic solids to settle out and form a sludge. This raw sludge is collected by means of travelling scrapers which are mounted on carriages that travel back and forth on rails running the length of the tanks. On the forward pass, the scrapers push raw sludge to hoppers on the bottom at one end of the tank from which it is drawn off at regular intervals. On the return pass, scum or grease is skimmed from the surface and deposited in scum aprons at the opposite end of the tank to the sludge hoppers. Both raw sludge and scum are pumped to the primary digester. The partially treated sewage then flows over the weirs to the aeration section.

RAW SLUDGE THICKENING PIT

The raw sludge from the primary sedi-

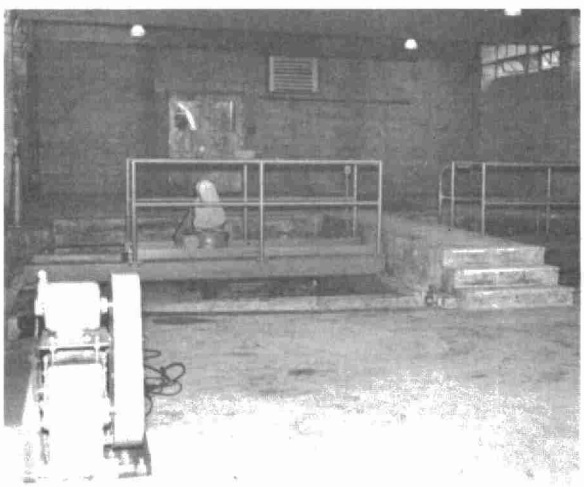
mentation tanks can be pumped to a thickening pit where excess water can be removed before pumping it to the digester. Due to odour problems with this tank, it has been taken out of service.

AERATION

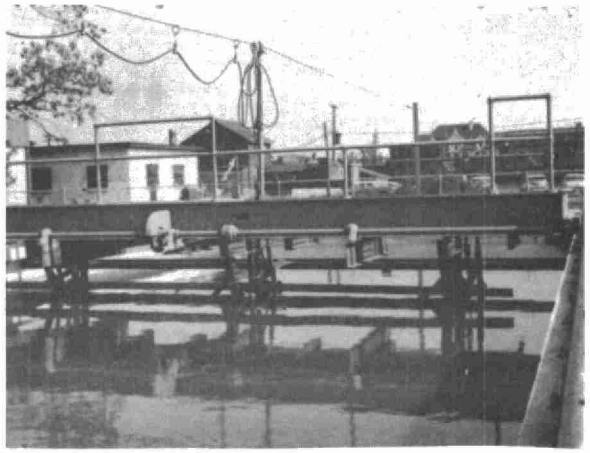
Sewage from the primary sedimentation tanks flows by gravity to four single pass aeration tanks where it is mixed with activated sludge that has been returned from the final sedimentation tanks. Air is injected into the tank through air diffusers near the tank bottom. Two blowers powered by gas engines provide this air, based on design flow, at a rate of 1.35 cubic feet per gallon of sewage. The biological floc produced in the aeration section requires food and oxygen. The sewage is the food source and the air is the oxygen source. Continual control is maintained on the aeration section by means of a routine sampling procedure. From the test results, the variables are adjusted to establish optimum conditions in this section.

FINAL SEDIMENTATION TANKS

The aerated mixed liquor from the aeration section is directed to two square final sedimentation tanks. There the floc is allowed to settle to the bottom and be collected by means of submerged rotary collectors. Some of the sludge is returned to the aeration section where it is instrumental in the activated sludge process. The rest is wasted to the primary sedimentation tank where it is removed with the raw sludge.



INFLUENT WORKS



PRIMARY SEDIMENTATION TANKS

CHLORINE CONTACT CHAMBERS

The effluent from the final sedimentation tanks is chlorinated during the summer months as required by the Division of Sanitary Engineering of the OWRC. The final effluent is then discharged to Lake Nipissing, 1,000 feet from shore.

SLUDGE DIGESTION TANKS

The raw and waste activated sludges are pumped to the primary digester where they are mixed and maintained at about 90° Fahrenheit. The sludge digestion in this plant is of the anaerobic alkaline process. It is in the primary digester that the greatest proportion of sludge stabilization is achieved. The sludge passes through the acid stage to the methane gas producing stage in which vast amounts of combustible methane gas are produced. This gas is used to heat the digesters and also as fuel for the gas engines which drive the blowers.

Sludge is transferred from the primary digester to the secondary digester where concentration of the solids is effected. The solids are pumped from the bottom of the secondary digester to a waiting tank truck for disposal. Supernatant is returned from the secondary digester to the primary sedimentation tanks.

PROJECT COSTS

LONG TERM DEBT
(Total Capital Cost):

N. Bay City	$1,162,778.90
W. Ferris Twp.	899,874.10
Widdifield Twp.	251,890.73
TOTAL	$2,314,543.73

Debt Retirement Balance at Credit
(Sinking Fund) December 31, 1965

N. Bay City	$ 156,066.52
W. Ferris Twp.	107,203.39
Widdifield Twp.	19,116.65
TOTAL	$ 282,386.56

The total cost to the municipality during 1965 was as follows:

NET OPERATING

N. Bay City	$62,685.21	
W. Ferris Twp.	10,064.57	
Widdifield Twp.	9,455.97	$ 82,205.75

DEBT RETIREMENT

N. Bay City	$25,080.00	
W. Ferris Twp.	17,987.00	
Widdifield Twp.	3,672.00	$ 46,739.00

RESERVE

N. Bay City	$10,693.62	
W. Ferris Twp.	6,024.60	
Widdifield Twp.	1,402.78	$ 18,121.00

INTEREST CHARGES

N. Bay City	$69,645.64	
W. Ferris Twp.	49,943.42	
Widdifield Twp.	10,201.54	$ 129,790.60
TOTAL		$ 276,856.35

RESERVE ACCOUNT

BALANCE AT JANUARY 1, 1965 (Revised)

N. Bay City	$42,411.19	
W. Ferris Twp.	28,741.18	
Widdifield Twp.	3,810.76	$74,963.13

DEPOSITED BY MUNICIPALITY

N. Bay City	$ 8,500.71	
W. Ferris Twp.	5,349.59	
Widdifield Twp.	948.22	$14,798.52

INTEREST EARNED

N. Bay City	$ 2,565.85	
W. Ferris Twp.	1,592.61	
Widdifield Twp.	227.07	$ 4,385.53
		$94,147.18

LESS EXPENDITURES

N. Bay City	$ 2,089.30	
W. Ferris Twp.	551.83	
Widdifield Twp.	185.88	$ 2,827.01

Balance at December 31, 1965 $91,320.17

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	*SUNDRY	WATER
JAN	2839.30	2391.43		66.47			147.82	12.71	139.54	77.83	3.50
FEB	5459.49	2394.02			726.00		97.20	24.35	91.86	2092.10	33.96
MARCH	5653.42	2815.61			727.82		188.69		982.01	911.93	27.36
APRIL	3877.13	2756.55			860.20		69.10		105.24	76.14	9.90
MAY	9811.05	3830.27			955.15		168.51	174.20	192.98	4442.35	47.59
JUNE	6888.31	2679.81	206.58		1157.26	1297.80	193.64	7.63	136.73	1094.25	114.61
JULY	6422.93	2535.72	275.68		950.58	54.48	328.34		735.77	1282.71	259.65
AUG	6705.33	2567.15	358.30		1217.39		126.26	(0.45)	897.77	1201.23	337.68
SEPT	7352.40	2702.26	275.44	15.90	1070.38		75.14	106.72	1287.32	1441.17	378.07
OCT	10421.51	4182.75	187.22	27.84	1106.44		462.28	49.44	519.98	3513.91	371.65
NOV	5994.64	2805.64		15.00	1082.14		349.95	14.19	326.97	1264.11	136.64
DEC	7746.09	2830.27			2365.90		231.85	155.59	592.25	1526.92	43.31
TOTAL	79171.60**	34491.48	1303.22	125.21	12219.26	1352.28	2438.78	544.38	6008.42	18924.65	1763.92

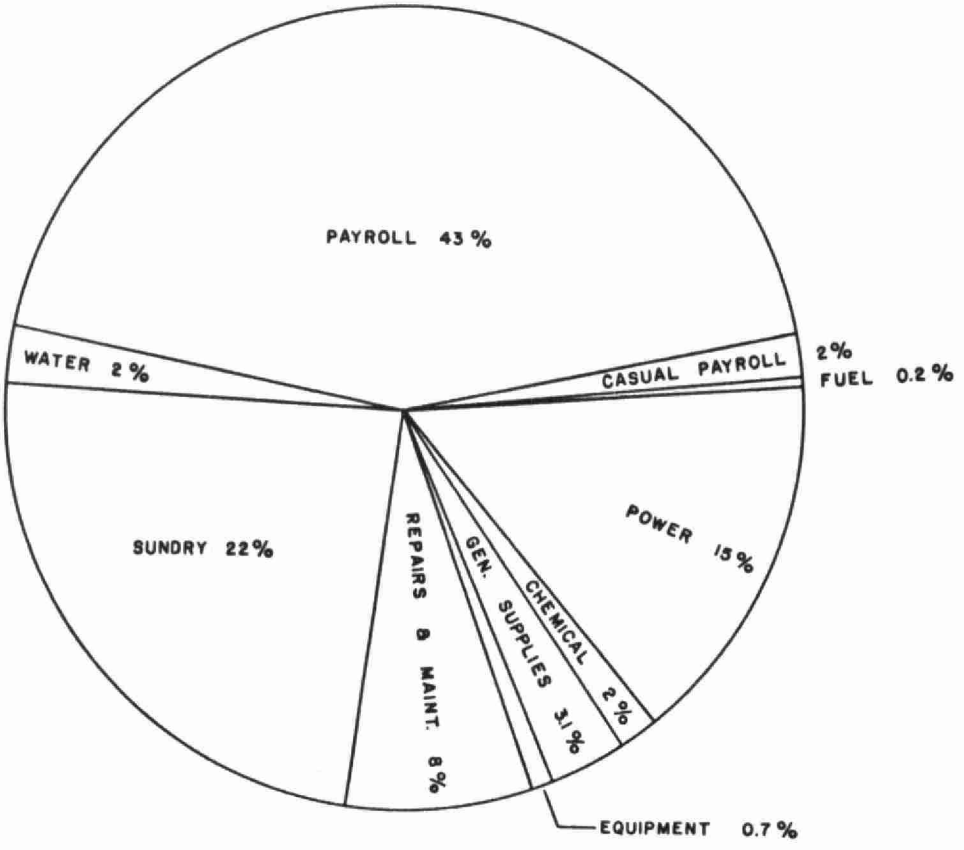
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $12,829.38
BRACKETS INDICATE CREDIT
** NOT INCLUDING DIRECT ALLOCATIONS TO WEST FERRIS AND WIDDIFIELD

YEARLY OPERATING COSTS

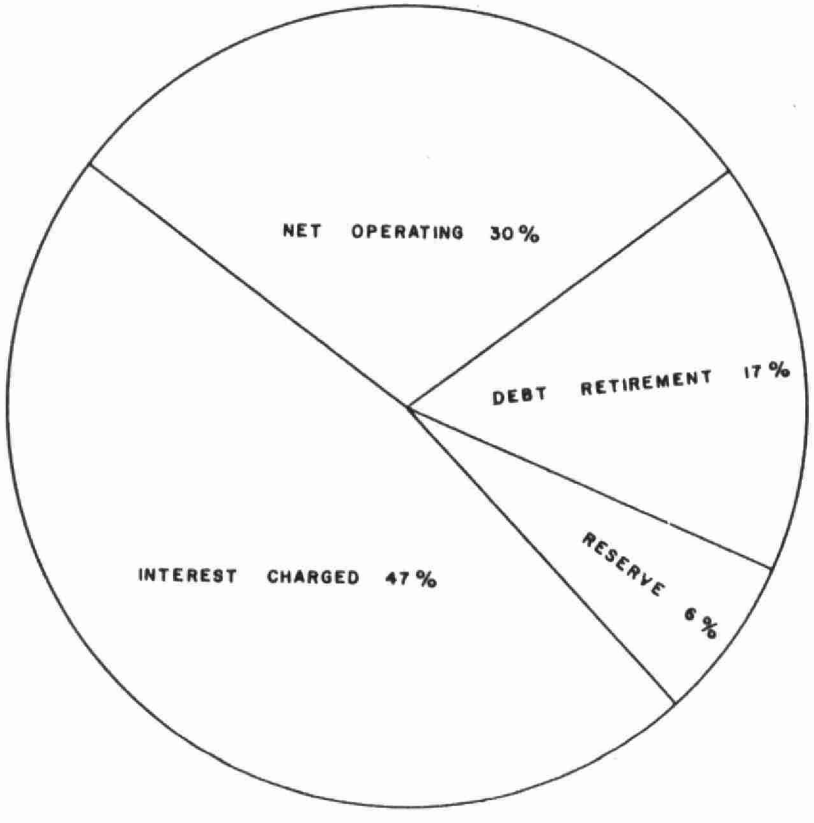
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	1430.000	$ 7888.15	* $ 7.53	$ 52.37	4 CENTS
1962	1118.630	68352.13	6.82	61.09	6 CENTS
1963	1234.303	67131.06	6.63	54.39	4 CENTS
1964	1234.328	72953.91	12.17	59.10	4 CENTS
1965	1379.973	79171.60	13.22	57.37	6 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

1965 OPERATING COSTS

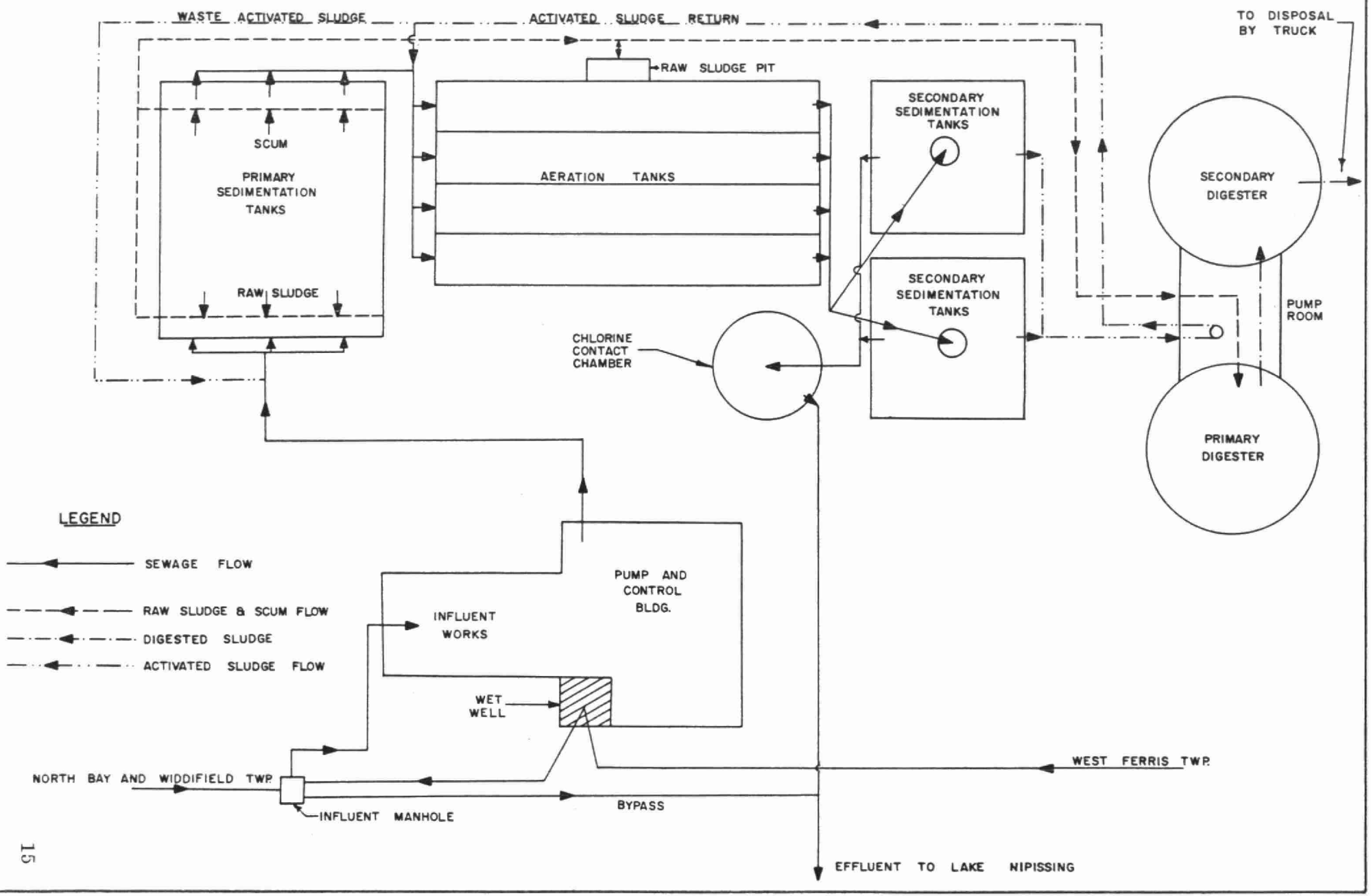


TOTAL ANNUAL COST



Technical Section

FLOW DIAGRAM FOR NORTH BAY AREA W.P.C.P.



Design-Data

GENERAL

Type of Plant - Activated sludge process.

Design Population - 50,000 persons.

Design Plant Flow - 4.0 MGD.

Per Capita Flow - 80 Imperial gallons per day.

Five Day BOD -

Raw Sewage	-	150 PPM
Removal	-	85 %

PRIMARY TREATMENT

Grit Removal

Size - 2 parallel 11.5' x 11.5' x 2.0' liquid depth tanks.

Volume - 3,300 gallons.

Retention - 1.2 minutes.

Velocity - .163 fps.

Type of Unit - Walker type CRG grit collector with dragout and organic return pump.

Screening

Two Griductor Comminutors to cut sewage.

Bar screen on bypass channel.

Sewage Lift Pumps

Two - 4 MGD gas powered units.

One - 4 MGD electric powered unit.

Primary Sedimentation Tanks

Size - 90' x 30' x 10' depth, three units.

Volume - 505,000 gallons total.

Retention - 3 hours.

Surface Settling Rate - 500 gallons per sq. ft. of tank per day.

Weir Rate - 44,000 gallons per lineal ft. per day.

Hardinge Clarifier Mechanisms - for sludge and grease collection.

SECONDARY TREATMENT

Aeration Section

Size – 4 single pass tanks, 185' x 20' x 12' liquid depth.

Total volume – 1.1 MG.

Retention – 5.31 hours at 1.25 x design flow.

Air Supply – 1.35 cu. ft. per gallon.

– diffused air.

Five Day BOD Loading – 4,200 pounds per day total.

Final Sedimentation Tanks

Size – 2 units, 60' x 60' x 11' liquid depth.

Volume – 500,000 gallons.

Retention – 3 hours.

Surface Settling Rate – 550 gallons per sq. ft. per day.

Weir Rate – 8,000 gallons per lineal ft. per day.

Sludge collectors are Walker Type RSX circular.

Chlorine Contact Chamber

Size – 1 circular unit, 34 ft. diameter x 12.5 ft. depth.

Volume – 71,000 gallons.

Retention – 25 minutes.

Chlorinator – 500 lbs. scale. BIF semi-automatic.

Outfall

Size – 1,000 ft. of 36 inch diameter steel pipe.

Retention – 16 minutes.

Digestion System

Digesters – 2 units, one with floating cover, 65 ft. diameter each.

Volume – Primary – 70,000 cu. ft.
– Secondary – 74,000 cu. ft.

Per Capita Loading – 2.9 cu. ft. per capita.

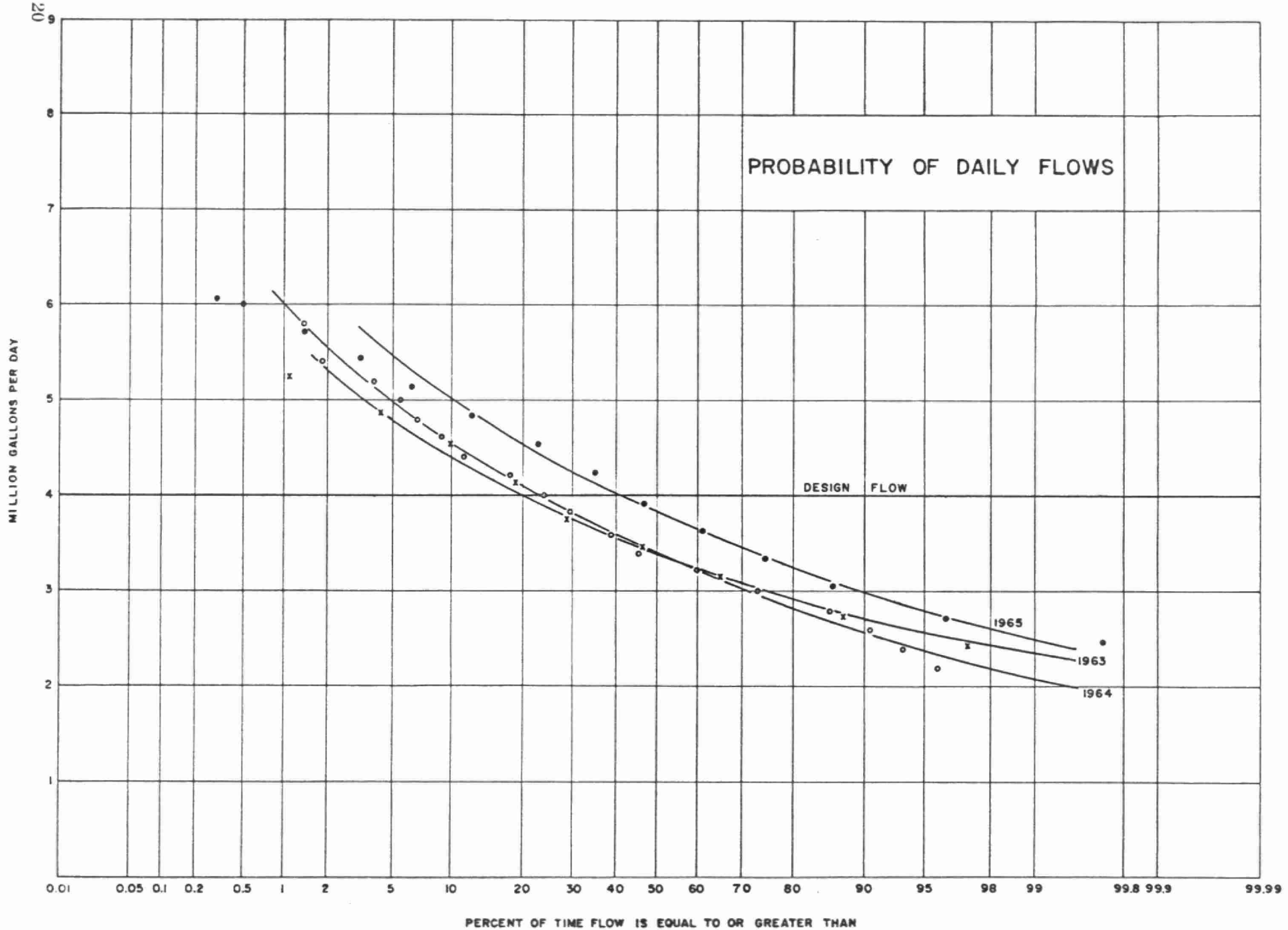
Mixing – 3 Dorr 5 HP draft tube mixers.

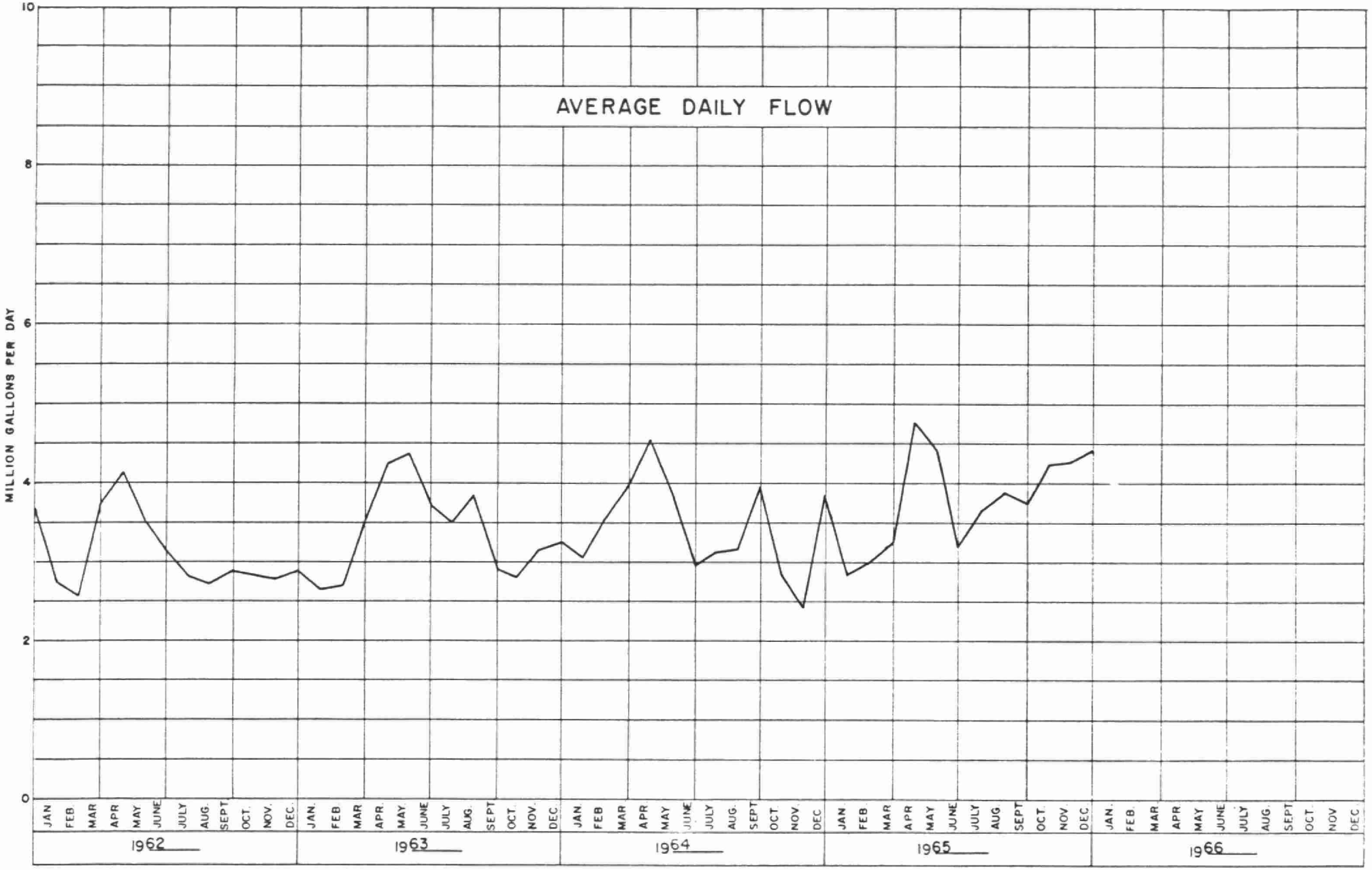
Process Data

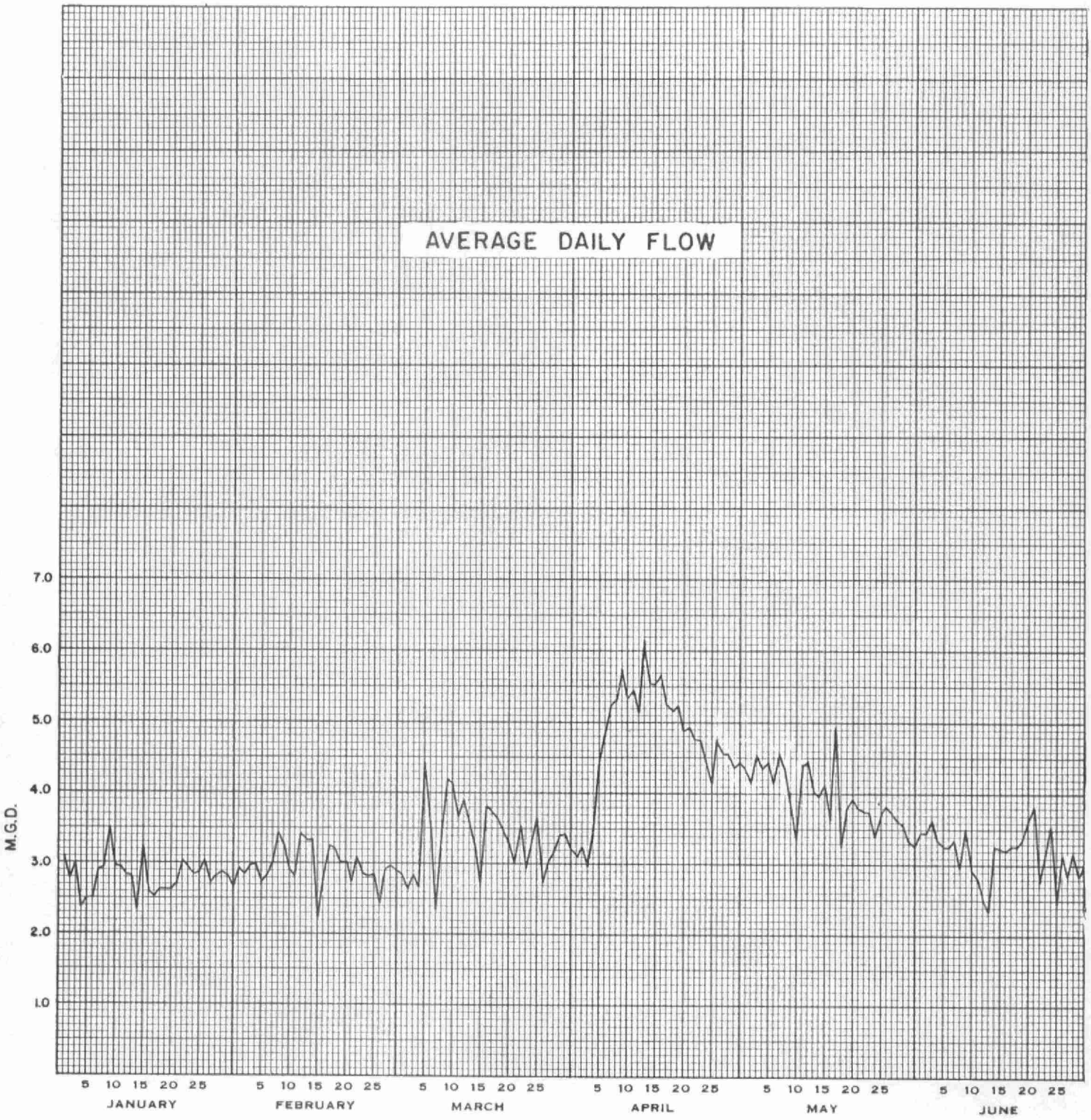
It should be noted from the Probability of Flows Graph that flows to the plant increased substantially in 1965 from that of 1963 and 1964. The average total precipitation for the City of North Bay from 1931 to 1960 was 33.96 inches. In 1965 the total precipitation in the City of North Bay was 36.85 inches.

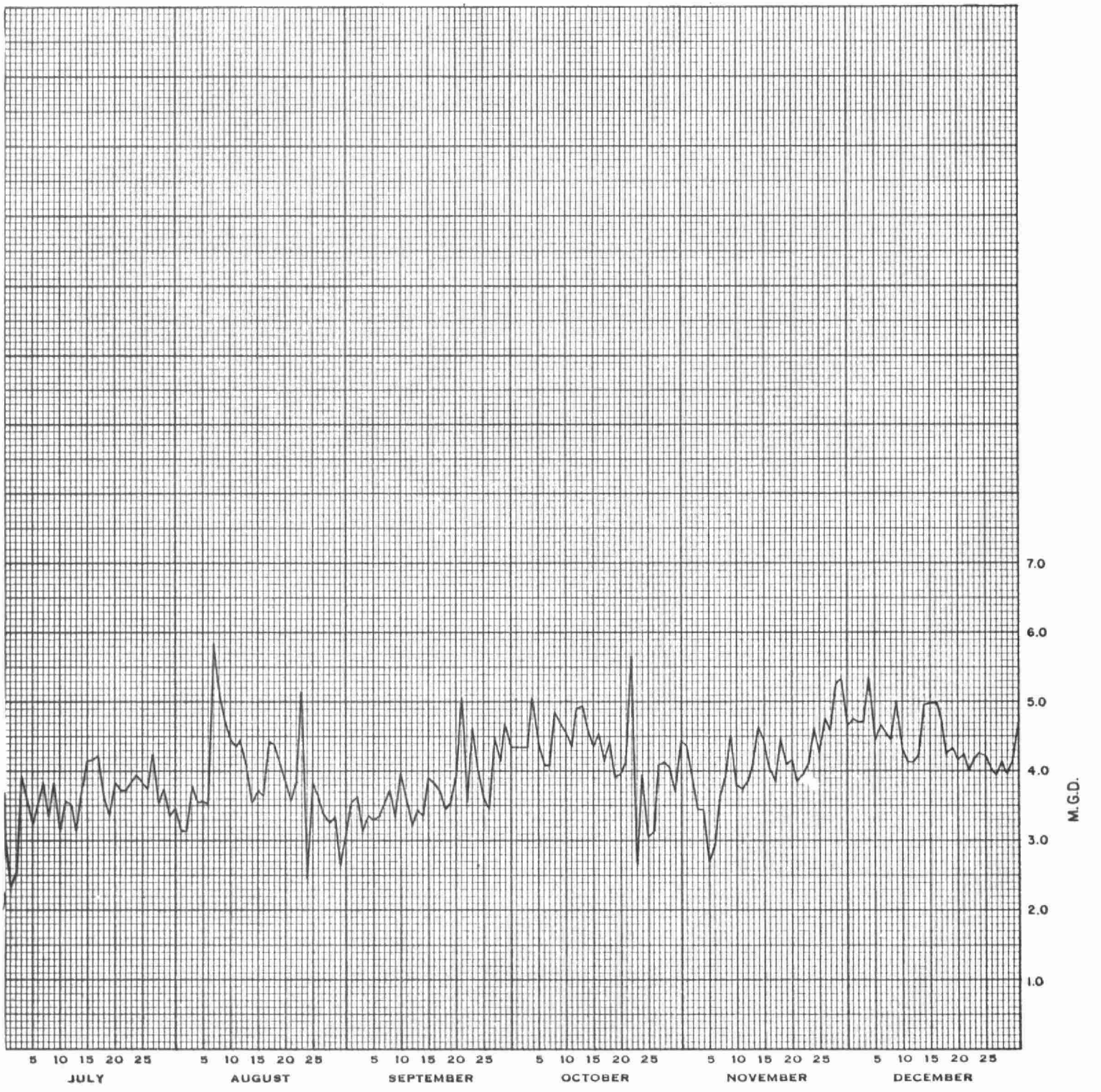
The plant design flow of 4.0 mgd was exceeded approximately 40 percent of the time.

Storm flow patterns are readily observed from the daily flow plot.


PROBABILITY OF DAILY FLOWS
DESIGN FLOW
1965
1963
1964
MILLION GALLONS PER DAY
PERCENT OF TIME FLOW IS EQUAL TO OR GREATER THAN
20
9
8
7
6
5
4
3
2
1
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99


AVERAGE DAILY FLOW
MILLION GALLONS PER DAY
10
8
6
4
2
0
JAN FEB MAR APR MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
1962
1963
1964
1965
1966


AVERAGE DAILY FLOW
M.G.D.
7.0
6.0
5.0
4.0
3.0
2.0
1.0
5 10 15 20 25
JANUARY
5 10 15 20 25
FEBRUARY
5 10 15 20 25
MARCH
5 10 15 20 25
APRIL
5 10 15 20 25
MAY
5 10 15 20 25
JUNE


7.0
6.0
5.0
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3.0
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1.0
M.G.D.
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JULY
5 10 15 20 25
AUGUST
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SEPTEMBER
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OCTOBER
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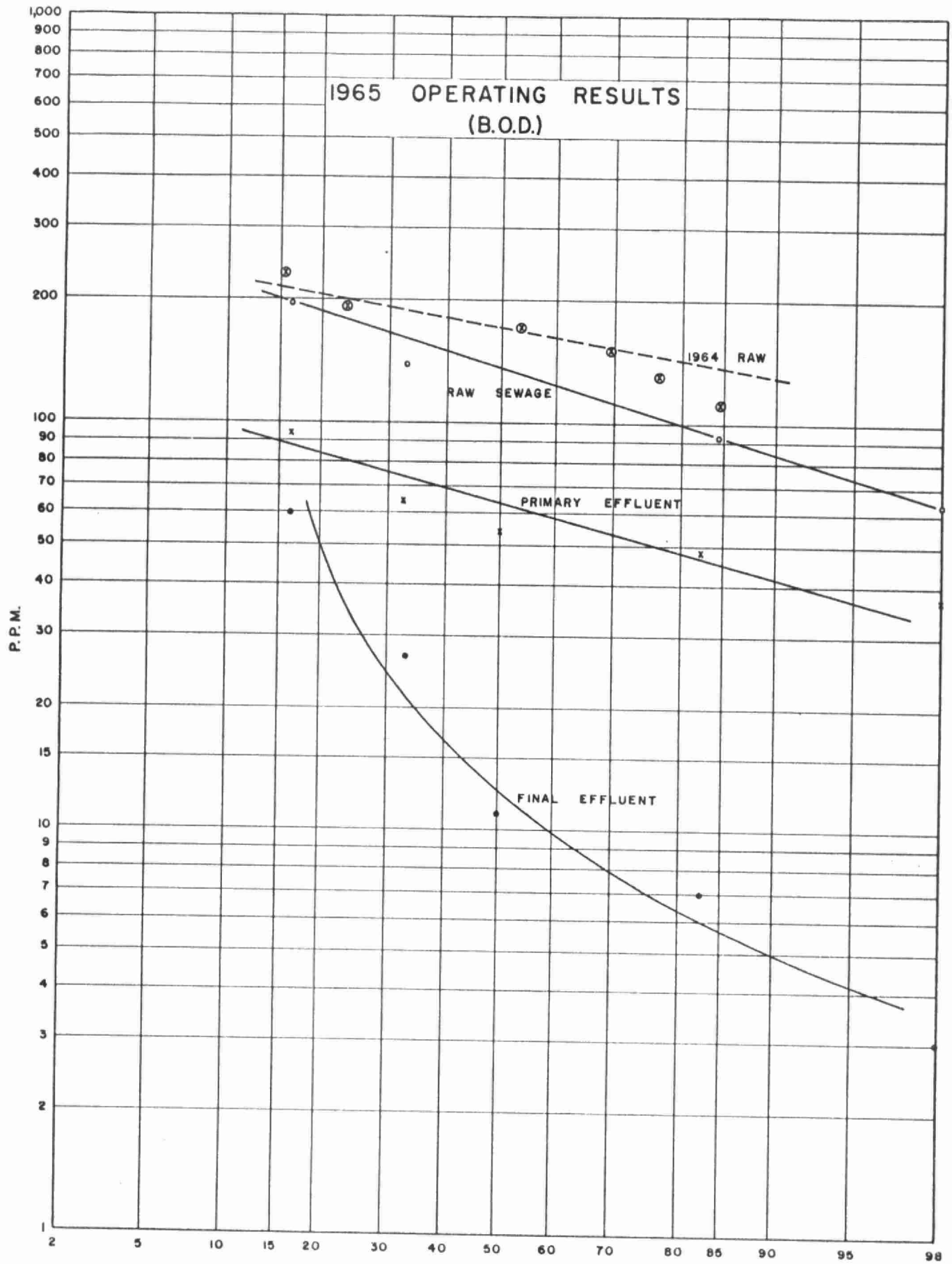
NOVEMBER
5 10 15 20 25
DECEMBER


1965 OPERATING RESULTS
(B.O.D.)
1964 RAW
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
P.P.M.
1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
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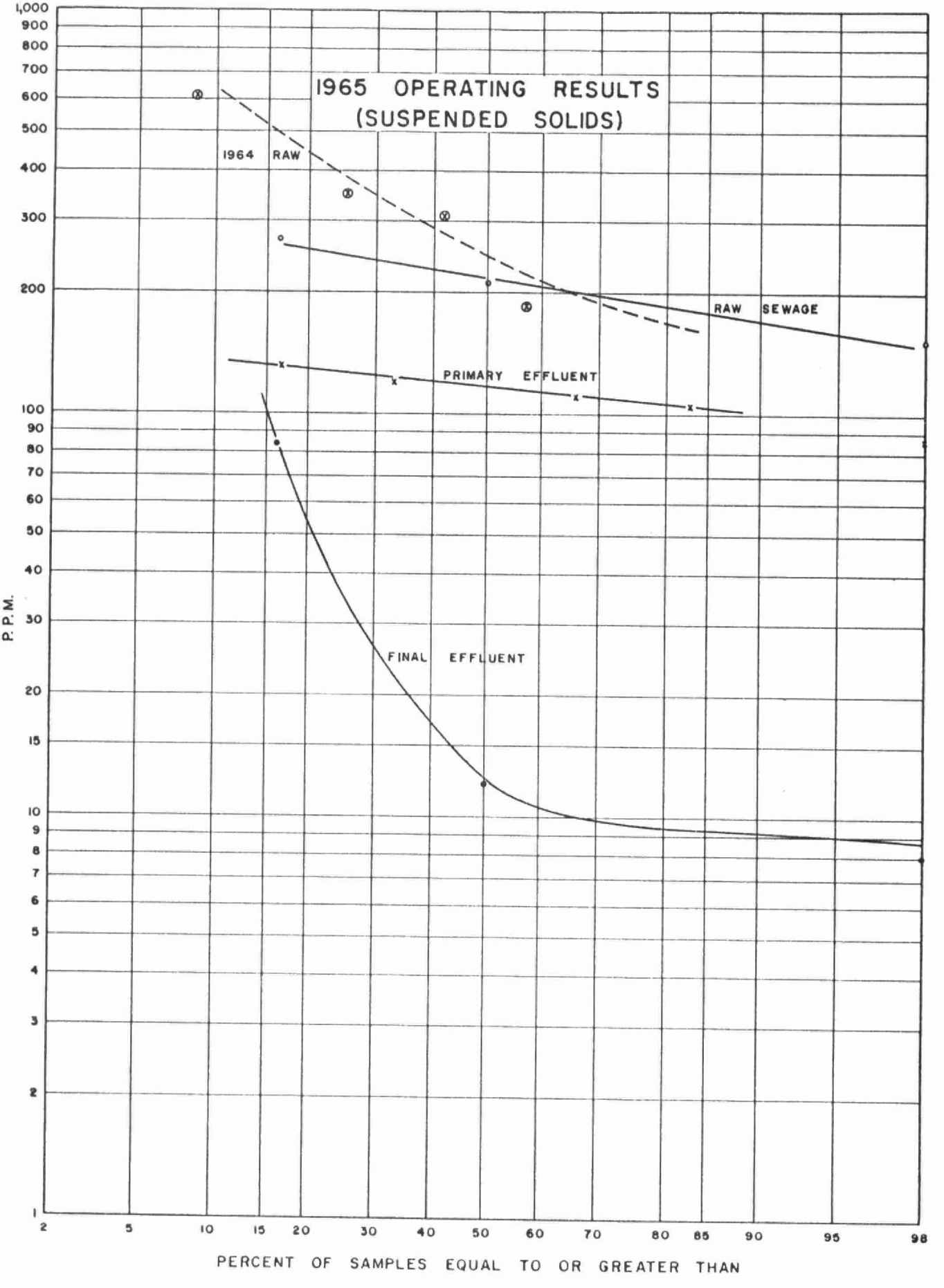
60
70
80
85
90
95
98
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN


1965 OPERATING RESULTS
(SUSPENDED SOLIDS)
1964 RAW
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
P.P.M.
1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
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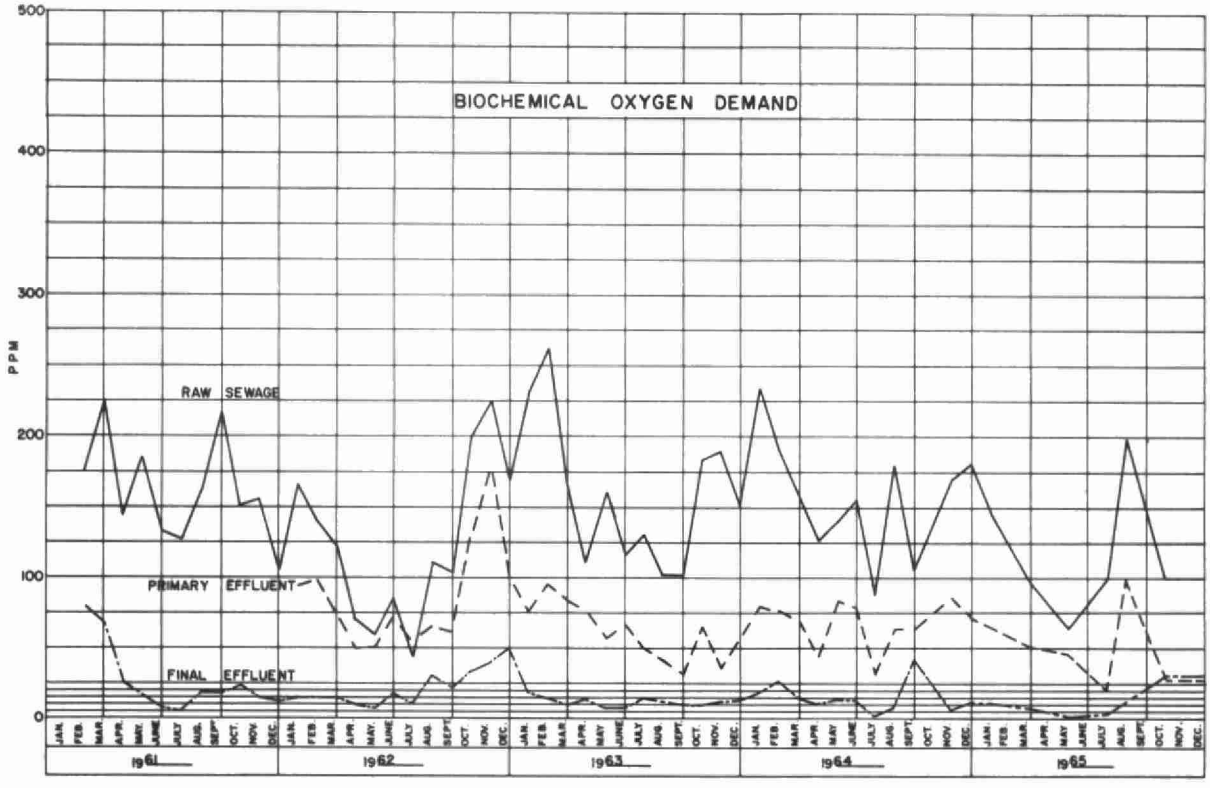
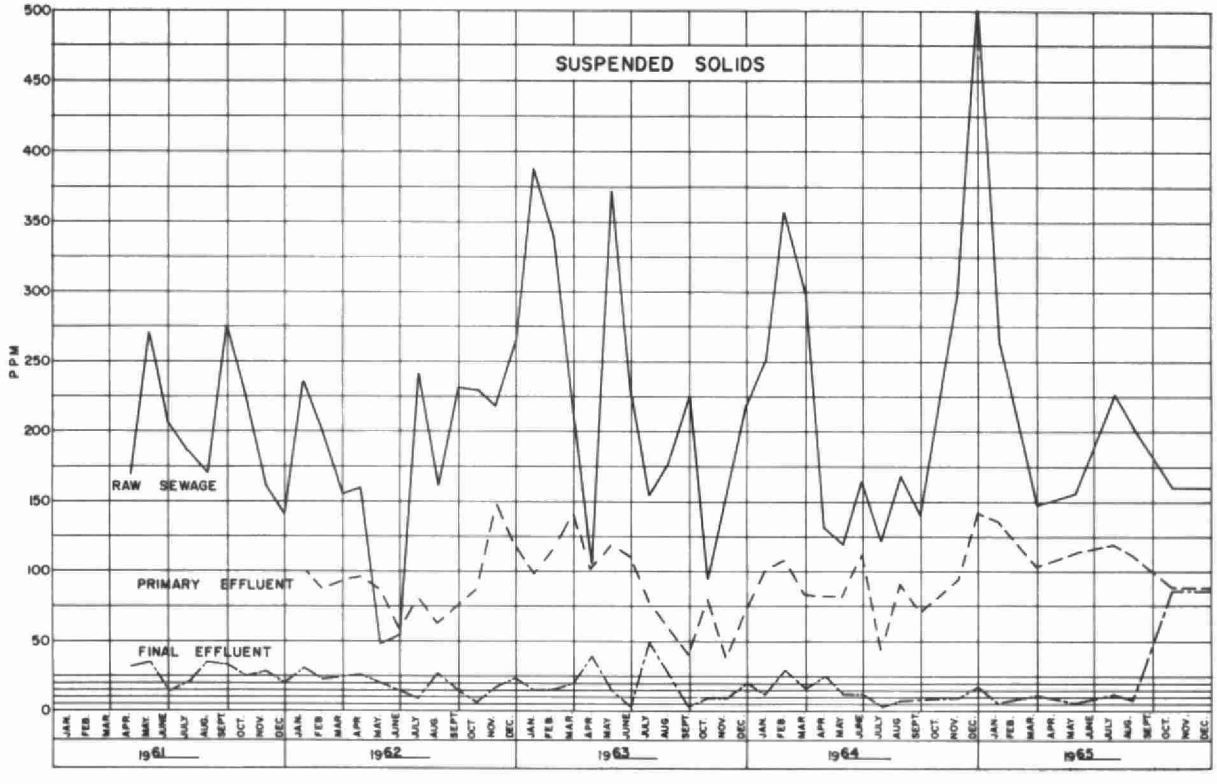
95
98
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN



MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	145	11	92.5	58.5	264	6	97.5	112.7	774
FEB.	*117	19	83.5	40.8	*192	21	89.0	71.2	526
MAR.	96	8	91.5	45.5	147	11	92.5	70.4	648
APR.	*117	19	83.5	70.4	*192	21	89.0	122.8	890
MAY	64	1.4	98.0	38.3	156	6	96.0	91.8	742
JUNE	*117	19	83.5	46.3	*192	21	89.0	80.8	654
JULY	98	6.6	93.0	51.6	226	11	95.0	121.5	798
AUG.	200	27	86.5	104.3	202	8	96.0	116.9	861
SEPT.	*117	19	83.5	55.4	*192	21	89.0	96.6	891
OCT.	100	60	40.0	26.5	160	85	47.0	49.7	617
NOV.	*117	19	83.5	62.9	*192	21	89.0	109.8	572
DEC.	*117	19	83.5	67.5	*192	21	89.0	117.8	480
TOTAL	-	-	-	676.2	-	-	-	1179.9	8453
AVG.	117	19	83.5	56.4	192	21	89.0	98.3	704

* Average value substituted. No sample

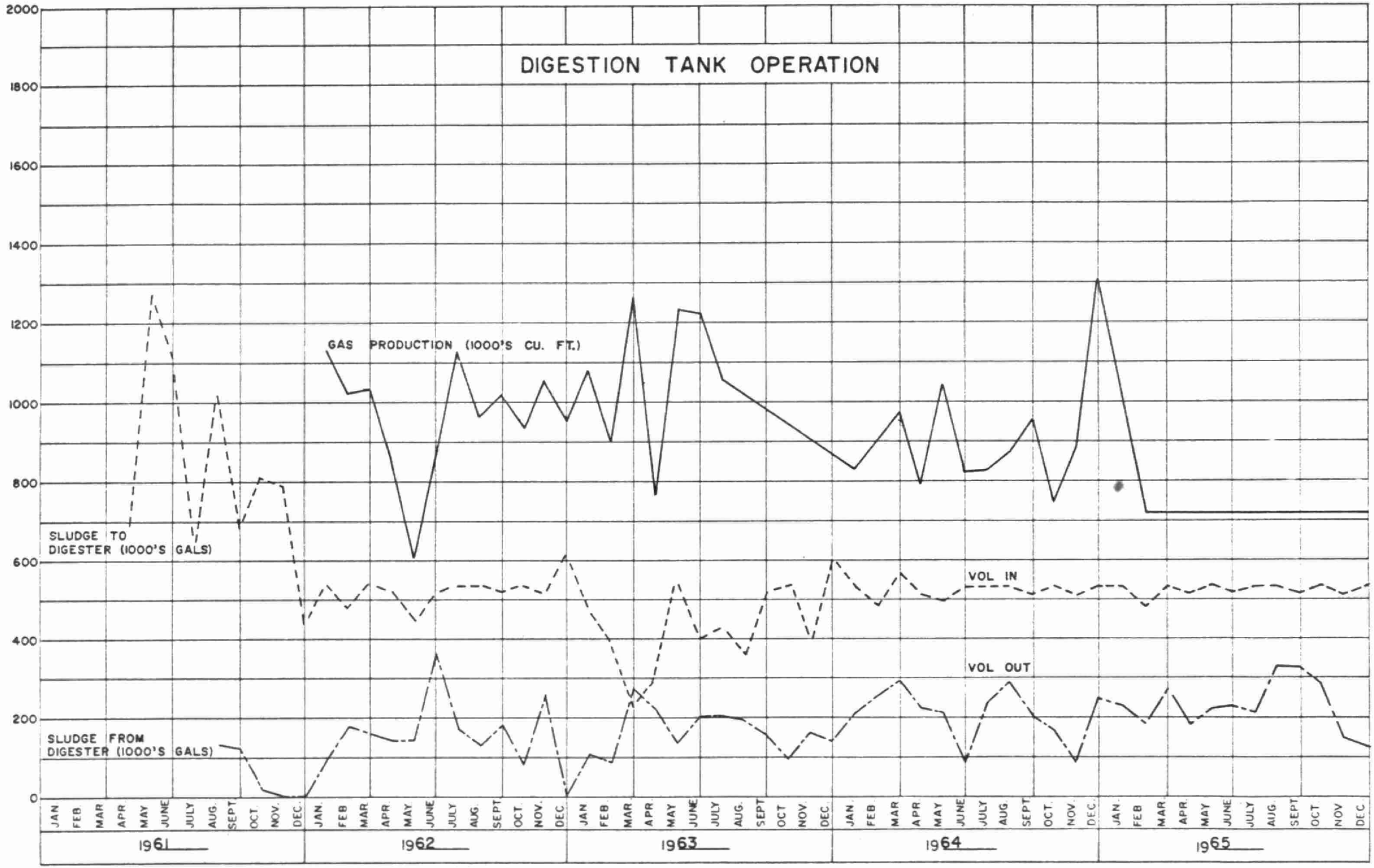
COMMENTS

In 1965, six 8-hour composite samples were collected and analyzed for BOD and suspended solids. The average concentration of BOD of the raw sewage was 117 ppm and average concentration of SS in the raw sewage was 192 ppm. These values are somewhat less than the average BOD and SS of the raw sewage during 1964.

The average concentration of BOD of the plant effluent was 19 ppm or a percent reduction of 83.5 The average concentration of suspended solids in the plant effluent was 21 ppm or a reduction of 89 percent.

In 1964 the percent removal of BOD was 90.5 and the percent removal of the suspended solids was 94.5.

It is felt that the reduction of the strength of the waste and the decrease of plant removal efficiency were affected by the greater flows received at the plant in 1965.


DIGESTION TANK OPERATION
GAS PRODUCTION (1000'S CU. FT.)
SLUDGE TO DIGESTER (1000'S GALS)
VOL IN
VOL OUT
SLUDGE FROM DIGESTER (1000'S GALS)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
JAN FEB MAR APR MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
1961
1962
1963
1964
1965

DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu Ft
	1000'S CU FT	% SOLIDS	% VOL MAT	1000'S CU FT	% SOLIDS	% VOL MAT	
JAN	85.85	3.22	-	37.20	3.51	-	1003.66
FEB	77.54	-	-	29.46	-	-	724.59
MAR	85.85	2.81	-	43.39	2.82	-	*
APR	83.08	-	-	29.12	-	-	*
MAY	85.85	3.85	-	36.06	2.72	-	*
JUNE	83.08	-	-	37.65	-	-	*
JULY	85.85	4.31	-	34.93	3.45	-	*
AUG.	85.85	1.29	-	53.81	3.68	-	*
SEPT.	83.08	-	-	52.42	-	-	*
OCT.	85.05	1.36	-	45.64	7.62	-	*
NOV.	83.08	-	-	24.15	-	-	*
DEC.	85.85	-	-	19.56	-	-	*
TOTAL	1010.01	-	-	443.39	-	-	*
AVG.	84.17	2.81	-	36.95	3.97	-	*

* Meter failure

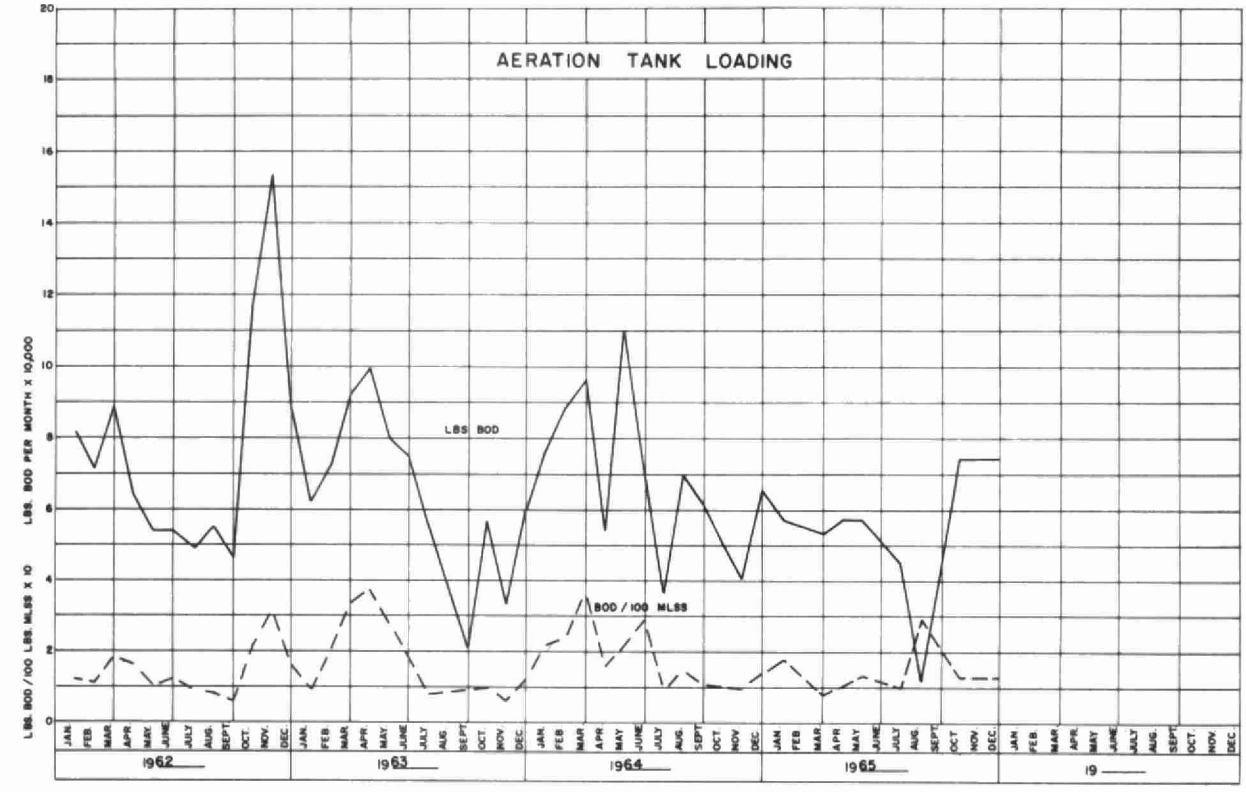
COMMENTS

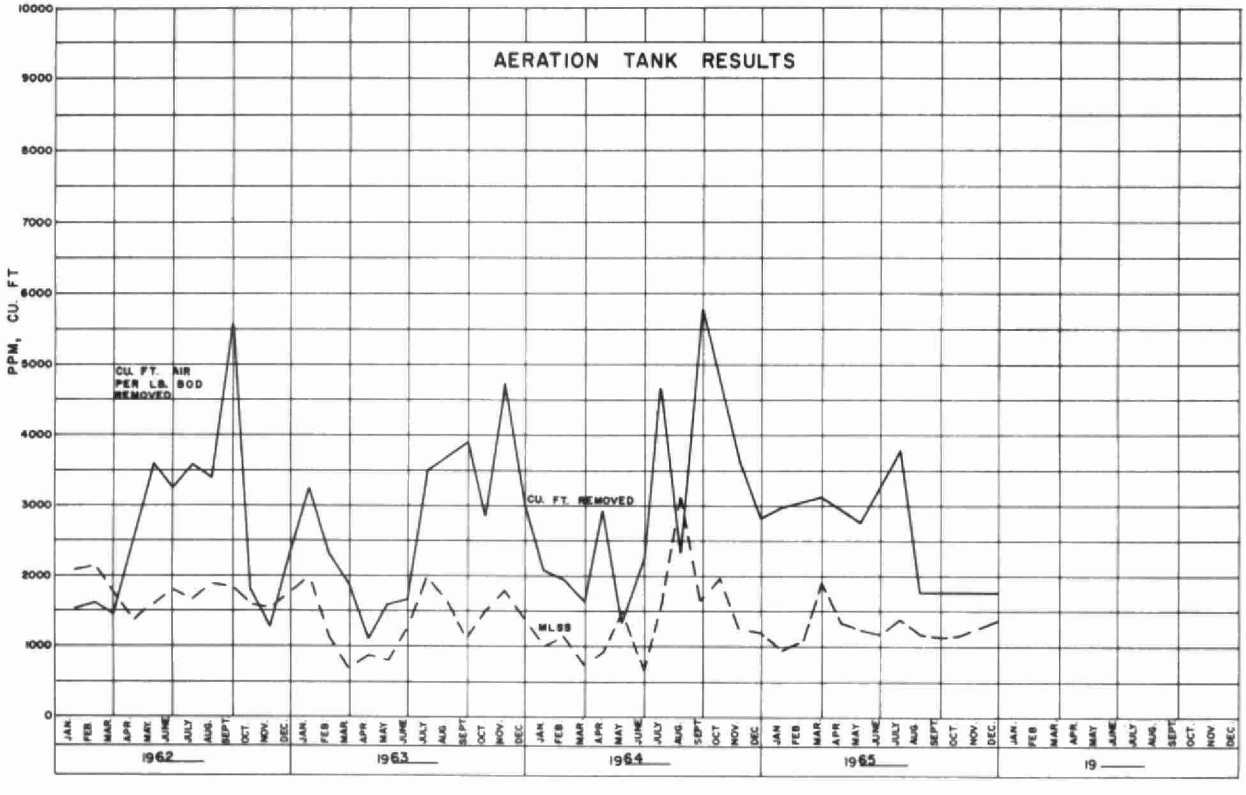
In 1965, a total of 1,010,000 cubic feet of sludge was pumped to the digesters. The average solids concentration of the sludge was 2.81 percent.

A total of 443,390 cubic feet of digested sludge was removed from the plant. The average solids concentration of the digested sludge was 3.97 percent.

The concentrations of both the raw sludge and the digested sludge appeared somewhat low.

The gas meter was inoperative for most of the year.


AERATION TANK LOADING
LBS. BOD PER MONTH X 10,000
LBS. BOD / 100 LBS. MLSS X 10
LBS. BOD
BOD / 100 MLSS
0
2
4
6
8
10
12
14
16
18
20
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1962
1963
1964
1965
19


AERATION TANK RESULTS
PPM, CU. FT
CU. FT. AIR PER LB. BOD REMOVED
CU. FT. REMOVED
MLSS
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1962
1963
1964
1965
19

AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	66	951	18	2975
FEBRUARY	-	1080	-	-
MARCH	52	1901	8	3114
APRIL	-	1320	-	-
MAY	47	1235	13	2766
JUNE	-	1191	-	-
JULY	40	1391	10	3763
AUGUST	100	1160	29	1732
SEPTEMBER	-	1133	-	-
OCTOBER	56	1338	13	-
NOVEMBER	-	1521	-	-
DECEMBER	-	1714	-	-
TOTAL	-	-	-	-
AVERAGE	60	1328	15	2870

COMMENTS

The average concentration of mixed liquor suspended solids in 1965 was 1223 ppm. The average aeration tank loading of 15 pounds of BOD per 100 pounds of suspended solids was very satisfactory as it is commonly accepted knowledge that best plant results are obtained for plant loadings from 20 - 25 pounds of BOD per 100 pounds of suspended solids.

CHLORINATION

PLANT FLOW IN

MILLIONS OF GALLONS

JANUARY	87.353	JULY	113.009
FEBRUARY	83.272	AUGUST	120.601
MARCH	103.482	SEPTEMBER	113.042
APRIL	143.578	OCTOBER	132.553
MAY	122.402	NOVEMBER	128.456
JUNE	94.465	DECEMBER	137.760

TOTAL 1379.973

AVERAGE 114.998

COMMENTS

Chlorination was practised at the North Bay Area Water Pollution Control Plant for effluent disinfection purposes. The chlorination season began May 15 and ended October 15.

A chlorine residual of 0.5 ppm was maintained in the plant effluent. Chlorine dosages are not available since no means of weighing 1 ton chlorine cylinders was available.

RECOMMENDATIONS

1. It is recommended that an investigation be made into the flooding of basements along Queen Street. Once the causes are known, means to alleviate the flooding should be initiated.

2. It is recommended that efforts be maintained to eliminate storm water from the sanitary sewer system.

3. It is recommended that Consulting Engineers be hired to study the flows to the plant and to make recommendations regarding plant enlargement.


ONTARIO WATER RESOURCES COMMISSION